



**OFFICE OF THE CITY ENGINEER**

# **POLICY MANUAL**

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## **Intent**

These Engineering Policies are intended to supplement the Thoroughfare Plan, Subdivision Control Ordinance, Zoning Ordinance and the Columbus Municipal Code. These policies are intended to be followed for new construction and for the maintenance or improvement of existing streets and storm water infrastructure.

## **General Policies**

Unless otherwise specified, all work done and all materials used shall comply with the following:

- Indiana Department of Transportation Standard (INDOT) Specifications, latest edition.
- Indiana Manual on Uniform Traffic Control Devices (MUTCD), latest edition.
- A Policy on Geometric Design of Highways and Streets, American Association of State Highway and Transportation Officials (AASHTO), latest edition.

## **Paving Materials**

### **Asphalt**

Asphalt shall be produced, handled, and placed in accordance with the Indiana Department of Transportation (INDOT) Standard Specifications (latest edition) and shall consist of the following:

- Surface: HMA Bituminous Surface, 9.5mm (1 inch minimum thickness)
- Binder: HMA Bituminous Intermediate, 12.5mm or 19.0mm (1.5 inch min. thickness)
- Base: HMA Bituminous Base, 25.0mm (2.5 inch minimum thickness)
- Prime Coat (not required): AE-P (if used, shall be applied at the rate of 0.5 gal./sq.yd.)
- Tack Coat: AE-T (applied at the rate of 0.05 gal./sq.yd.)

## Concrete

Concrete shall be produced, handled, and placed in accordance with the Indiana Department of Transportation (INDOT) Standard Specifications (latest edition) and shall the following:

- Maximum spacing between load transfer joints: 15 feet for streets and curbs.
- Maximum spacing between expansion joints: 150 feet for streets and curbs.
- Maximum spacing between joints for sidewalks shall not exceed the sidewalk width.
- Air Entrainment: 5% minimum
- Compressive strength: 4000 psi minimum, INDOT Class A concrete
- Finish: Broomed or tined for streets and bridges. Broomed for sidewalks.
- Curing: Curing compound\* and protection from weather for 48 hours minimum.

\*An acrylic based liquid membrane forming curing compound meeting requirements of ASTM C-1315 (Type I, Class A) shall be applied to all new concrete installed in the right of way. Curing compound shall be spray applied at a rate of 300 square feet per gallon when concrete has set up enough to walk on without marring, and in all cases applied on the same day as the new concrete is placed. Curing compound and application device shall be kept at or above 50 degrees F at all times.

## **Culverts**

Any proposed culverts on new streets shall be designed to meet the approval of the City Engineer. The size of all culverts shall be determined by the amount of storm water flow which is expected with full development upstream in the watershed for a 100 year storm, but shall not be less than 12 inches in diameter. Any ponding which is anticipated upstream from a culvert shall be contained within an easement for that purpose and shall not encroach upon any public street, pedestrian facility, or buildable area.

All culverts shall extend beyond the edges of the pavement and sidewalks a sufficient distance for side slopes which do not require guard rails. The ends of all culverts shall have flared end sections or other protective devices. Rip rap over geotextile fabric shall be provide at the upstream and downstream end of the culvert. Headwalls are not allowed for culverts less than 48 inch span.

If a proposed subdivision or development, for which widening of the existing street is required, is adjacent to an existing culvert and said culvert is shorter than required for the street widening, the owner or developer shall be required to lengthen the culvert. A culvert is defined as a structure which carries traffic over a ditch, stream, or other obstruction which has a total span length of less than 20 feet.

## **Curbs, Sidewalks, and Curb Ramps**

### **Curbs and Gutters**

Curbs and Gutters shall be designed and built to match the City's standard curb and gutter sections. The three types of curbs and gutters that are acceptable are:

- Roll type curb and gutter.\*
- Vertical curb and gutter (INDOT combined concrete curb and gutter, 6" or 8").
- Six inch vertical reveal curb (INDOT concrete curb).

All curbs and gutters shall have control joints spaced no greater than 10 feet and expansion joints installed at all inlets and at a maximum 150 foot spacing.

\*Roll type curbs shall not be used on major primary arterial, minor secondary arterial, collector, local commercial, local industrial streets, or on streets with sidewalks within 4 feet of the curb.

### **Concrete sidewalks**

Concrete sidewalks shall be a minimum of 4 inches in thickness except at driveway and alley crossings, where they shall be 6 inches thick. All concrete sidewalks shall have a broom finish. All concrete sidewalks shall have expansion joints installed at all property lines and at a maximum 100 foot spacing. In new construction, the tree lawn should slope 4% minimum toward the curb so the sidewalk finish elevation will be maintained higher than the top of curb.

### **Curb Ramps**

All curb ramps shall meet all applicable accessibility requirements and standards adopted by the Board of Public Works and Safety. Diagonal curb ramps shall not be used. Detectable warning (truncated domes) shall be cast iron panels manufactured for that purpose, cast into the concrete ramp during construction.

### **Drainage of Streets**

Streets shall serve as the primary drainage system unless the natural terrain dictates otherwise. The street drainage system shall be designed to carry and dispose of the runoff from the street, and all adjoining land and buildings within the watershed. If the street is located in an undeveloped or partially developed area, the drainage system shall be designed for the anticipated runoff at full development.

The drainage facilities shall be adequate to limit the spread of storm water on streets so that, during a 10 year storm, at least 24 feet of all arterial streets and collector streets will be free from storm water ponding and at least 10 feet of all local streets will be free from storm water ponding. During a 100 year storm, the spread of storm water ponding shall be limited to the street right-of-way, but shall not exceed 12 inches in depth at any point in the street.

All inlet structures and castings used on public streets and on all drainage systems which are to be accepted by the City shall be standard units as approved by the City Engineer. Bicycle and wheelchair safe protective grates shall be placed over all inlets.

All streets shall be designed and constructed so that storm water does not flow across intersections.

## **Street Construction**

### **Subgrade**

Subgrade shall be graded and compacted to conform to the elevations and cross sections specified in the improvement plans. The subgrade shall be inspected prior to the placement of the stone base or any pavement. The subgrade shall not rut or pump when proof rolled with a loaded tri-axle dump truck. If the developer disagrees with the inspection and proof rolling, the developer may, at his or her expense, retain an independent geotechnical engineer to test and inspect the soil and compaction. Subgrade shall be compacted to at least 95% of the maximum dry density as determined in accordance with AASHTO T99.

### **Undercutting**

Undercutting may be required if the street subgrade does not meet the compaction and proof rolling requirements. Any and all undercutting required shall be done at no additional cost to the City. Geotextiles or soil stabilization may be used as an alternate to undercutting with the approval of the City Engineer.

### **Underdrains**

Underdrains shall be installed along the edges of all new streets except in areas with predominantly Fox and/or Nineveh soils. Underdrains shall consist of 4 inch minimum diameter perforated corrugated plastic pipe with a geotextile “sock” and #8 stone bedding.

### **Superelevation**

Curves on local streets shall not be superelevated, normal crown shall be maintained. On collector streets and major or minor arterial streets, the superelevation rate shall be determined by using “A Policy on Geometric Design of Highways and Streets” (latest edition) as published by the American Association of State Highway and Transportation Officials (AASHTO) for urban streets.

### **Pavement Joints**

Where new and existing asphalt pavements meet, the existing pavement shall be saw cut to neat lines and milled a minimum of 1.5" deep x 18" wide to allow new bituminous surface to overlap the joint.

## **Speed Control**

### **Speed limits**

Speed limits and enforcement are the primary means of speed control in the City of Columbus. Speed limits on all streets must be established on the basis of an engineering and traffic investigation in accordance with the procedures in the IMUTCD as required by Indiana Code. Speed limits below 30 mph shall not be posted except in city parks, school speed limits, and in instances where roadway conditions do not allow speeds of 30 mph or more during daytime hours.

### **School speed limits**

School speed limits shall be established and signed in conformance with the IMUTCD. School speed limits shall be 25 mph with a "School" sign above and "When Children Present" or "When Flashing" (with flashing lights) below. The school speed limit shall be used in conjunction with a standard speed limit sign. School speed limits may be used at approaches to school property, school crossings, and along major school routes.

### **Alley speed limits**

Alley speed limits are limited by city ordinance to 15 mph. Alley speed limits are not posted due to space limitations.

### **Speed bumps**

Speed humps, or rumble strips shall not allowed on public streets or alleys in the City.

## **Traffic Control Devices**

### **Traffic Signs**

All city street intersections shall have some form of traffic control. The traffic control shall be stop signs, yield signs, or traffic signals, or roundabouts. All traffic control devices shall be in conformance with the MUTCD. Stop and yield signs shall be located in conformance with the MUTCD. All street intersections shall have traffic control devices and street name signs in place prior to acceptance by the City. During construction or improvement of all streets, construction signs, barricades, and other warning devices shall be installed in conformance with the MUTCD.

### **Pavement Markings**

Centerline markings shall generally be installed on collector and major or minor arterial streets only. Centerline markings shall generally be broken yellow lines. Double yellow centerlines shall be reserved for four lane streets and hazardous areas as determined by the City Engineer. Excessive use of centerline markings should be avoided. All pavement markings shall be installed in accordance with the MUTCD. All pavement markings shall be thermoplastic material unless an alternate material is specifically approved by the City Engineer.

### **Children at Play**

Children at play or similar type signs shall not be used on public streets or alleys in the City.

## **Lighting**

It is the policy of the City to install street lights at the following locations:

- at or near all city street intersections
- at the ends of all cul-de-sacs which are over 150 feet in length
- at other potentially hazardous locations as approved by the Board of Public Works and Safety.
- at other locations on streets designated as major arterial, minor arterial, or collector to provide more continuous lighting.



## **Standard**

The City's standard streetlight is a 100 watt cobra head sodium vapor light mounted on a wood pole. The lights and poles are owned, operated, and maintained by Duke Energy or Bartholomew County REMC.

## **Types**

All streetlights installed on streets designated as major arterial, minor arterial, or collector shall be a cobra head light or a rectangular cutoff light mounted at approximately 30 feet in height with wattages of at least 100 watts. The City may require higher wattage lights on streets designated as major arterial, minor arterial, or collector as deemed necessary for safety.

## **New Developments**

If a developer wishes to have lights and/or poles installed on city streets other than the standard, such developer shall pay any additional charges for the installation, maintenance, and operation of such lights and/or poles so that the City will not incur any additional expense beyond the normal cost of a standard wood pole and a 100 watt cobra head sodium vapor light, and the lights and/or poles must be readily maintainable by the utility company.

## **Ownership**

The City shall not accept ownership or accept maintenance responsibility for any street lighting system, unless specifically agreed upon by the Board of Public Works and Safety. If a developer or owner wishes to install, own, and maintain a lighting system on public streets within a development or subdivision, said owner or developer shall submit a maintenance plan, which shall include a description of how and by whom the lights and poles are to be maintained. This section shall also apply to lighting systems installed, owned and maintained by an association.

## **Lighting Plan**

As part of the subdivision improvement plans, the owner or developer shall submit a lighting plan for review. The plan shall include all landscaping in order to ensure that the effectiveness of street lights shall not be compromised by the landscaping or trees. The plans shall consider the impact of the trees on the lighting as the trees grow.

## **Additional Lights**

If a developer or owner wishes to install more streetlights than required by this policy, such developer or owner shall pay all costs associated with installation, maintenance, and operation of such additional lights.

## **Pedestrian Lighting**

Pedestrian lighting shall be accomplished with standard street lighting whenever possible. Installation of special pedestrian lighting should be considered in only extreme situations due to the cost implications. Extreme situations include areas where large amounts of pedestrian traffic are frequently present during darkness hours. The City shall not accept any pedestrian lighting system, unless specifically agreed upon by the Board of Public Works and Safety.

## **Construction Entrances**

In reviewing a request to plat, subdivide, or develop a parcel of land, the City Engineer shall consider the adequacy and suitability of nearby existing streets to accommodate construction traffic. The City Engineer may restrict the access of construction vehicles to the site or all traffic entering and exiting the site to specific streets only during the construction of the project.

## **Neighborhood Traffic Calming**

Appropriate neighborhood traffic calming devices shall be installed only to address documented safety or traffic concerns supported by a traffic engineering study. Neighborhood traffic calming measures are primarily intended for use on existing local residential streets.

## **Traffic Calming Eligibility Criteria**

Traffic safety concerns shall be documented by a traffic engineering study. The traffic engineering study shall be prepared by a qualified traffic engineer and shall address the following criteria in order to determine the need for traffic calming for each neighborhood request. Neighborhood traffic calming devices shall not be installed without the approval of the Board of Public Works and Safety.

## **Citizen Support**

In order to initiate a request for neighborhood traffic calming devices, the residents shall prepare and submit a petition which has been signed by 50 percent of the residents or property owners in the neighborhood. If the neighborhood has an association, the association shall also support the request.

## **Street Classification**

Citizen initiated requests for neighborhood traffic calming devices shall be limited to streets classified as Local or Collector in residential areas.

## **Traffic Volumes**

Neighborhood traffic calming devices shall be installed only on streets with less than 4,000 vehicles per day. Special studies and justification may warrant the limited use of neighborhood traffic calming devices on streets with traffic volumes outside of this range.

## **Traffic Speeds**

Neighborhood traffic calming devices shall be installed only on streets where the posted speed limit is 30 mph or less and the 85th percentile speed is 5 mph or more above the posted speed limit. Speed limits shall not be changed as a traffic calming measure.

## **Geometric Data**

Neighborhood traffic calming devices shall not be considered on streets with more than two travel lanes, or where the overall pavement is more than 40 feet in width.

## **Accident History**

The traffic engineering study shall include a review of the accident history for a 3 year period. The accident history shall include the number, locations, and types of accidents.

## **Procedure**

### **Preliminary Report**

The preliminary traffic engineering study shall be reviewed by the City Engineer. The preliminary report shall contain the information listed above and shall contain recommendations for neighborhood traffic calming devices.

### **Public Safety Agency Input**

Public Safety agencies shall be contacted to determine if emergency vehicle access and mobility will be adversely affected by the proposed changes.

### **Neighborhood Meeting**

After preliminary report approval, all neighborhood residents and property owners shall be invited to an information meeting. Approval of the proposed neighborhood traffic calming devices by at least 75% of the neighborhood residents and property owners shall be required to continue the process.

### **Final Report Approval**

Following the neighborhood meeting, the final report shall be submitted to the City Engineer.

### **Implementation Plan**

Following neighborhood approval and final report approval, construction plans and cost estimates shall be prepared by the City Engineer.

### **Final Approval**

The City Engineer shall present the report to the Board of Public Works and Safety. Approval by the Board of Public Works and Safety shall be required before installation.

## **Construction**

Design, construction, and installation of approved neighborhood traffic calming devices shall be subject to funding availability and priorities, work crew schedules, and appropriate weather conditions.

## **Post-Construction Evaluation**

An evaluation of the project effectiveness shall be conducted approximately one year after implementation. The evaluation shall address speeds, accidents, and traffic volumes before and after the installation.

## **Removal of Traffic Calming Devices**

The City of Columbus may order the removal of a traffic calming measure if the measure fails to achieve the expected benefits. The performance of each device shall be reviewed by the post-construction evaluation.

## **Prohibited Traffic Calming Devices**

The following traffic calming devices shall not be used on public streets within the City of Columbus:

- Speed bumps
- Speed humps
- Speed tables
- Chicanes
- Neckdowns and chokers
- Street closures
- Diagonal diverters

## **Acceptable Neighborhood Traffic Calming Devices**

The following is a list of alternative devices that may be considered.

## **Arterial Street Improvement and Signal Progression**

In order to minimize traffic cutting through neighborhoods, arterial street improvements or optimizing traffic signal systems shall be considered in conjunction with all neighborhood traffic calming measures.

### **Stop Signs**

Stop signs are the primary form of intersection traffic control at intersections within a neighborhood. The use and locations of stop signs shall be carefully considered to achieve the desired reduction of cut-through traffic in the neighborhood. Four-way or all-way stops shall not be used for traffic calming, unless the warrants in the MUTCD are met. Stop signs are expected to reduce speeds for a short distance before and after the sign. Stop signs shall not be used for the primary purpose of reducing speeds.

### **Speed Trailer, Speed Display Signs**

Speed trailers and speed display signs are mobile radar units that measure and display the speed of a vehicle as it drives by the unit. Speed trailers and speed display signs are best suited for temporary use in response to specific speeding complaints. These devices are expected to provide only temporary speed reduction.

### **Change in Roadway Surface**

Changes in road surface, or textured pavement, can be effective in reducing speeds. In order to minimize the effects of increased noise levels, locations shall be carefully selected. Changes in roadway surface may be installed on entire streets or may be strategically placed on short sections of streets. Changes in roadway surface shall be meet bicycle safety and accessibility requirements. This measure is expected to reduce vehicle speeds by 5 to 10 percent.

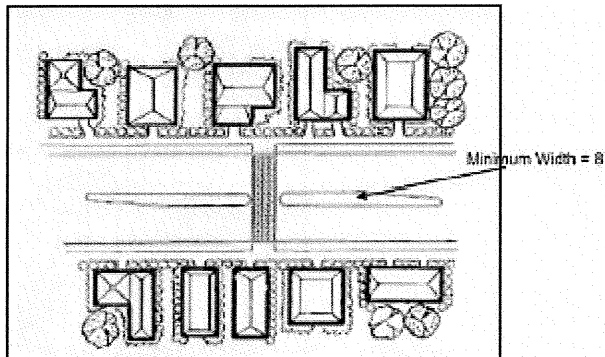
### **Raised Intersections**

Raised intersections are flat, raised areas covering entire intersections, with ramps on all approaches and often with brick or other textured materials on the flat section.

Raised Intersections shall be used at multiple locations along a street, and shall be spaced no closer than 200 feet nor more than 500 feet. Pavement markings shall be provided complying with the MUTCD. The primary effect is a reduction of speed by 5 to 10 percent.

## Pedestrian Refuge Island

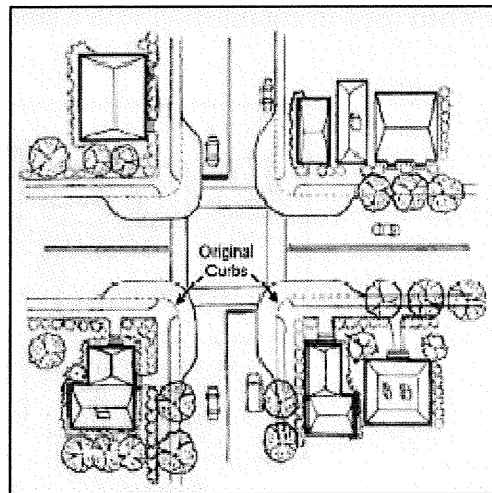
Pedestrian refuge islands provide safe havens for pedestrians when crossing the street and narrow excessively wide streets. Use of this device shall be limited to locations meeting the criteria for Level 3 of the Pedestrian Crossing Treatments section of this policy document. This device is most effective if used at multiple locations along a street. Some parking restrictions may be required in order to implement pedestrian refuge islands. This device is expected to reduce vehicle speeds by 5 to 10 percent, except when used in conjunction with a stop sign.



**Pedestrian Refuge Island**

## Intersection or Midblock Curb Extensions

Intersection or Midblock Curb Extensions at critical intersections or midblock crossings reduce the crossing distance for pedestrians and make the pedestrian crossing more visible to motorists. This device provides space for landscaping. It prevents vehicles from passing other vehicles that are turning. Some parking restrictions may be required in order to install curb extensions. This device is expected to reduce vehicle speeds by 5 to 10 percent, except when used in conjunction with a stop sign.



**Curb Extensions**

## Medians

Medians may be used to narrow an excessively wide street, to prohibit passing, and to control turning movements. Medians may be installed only on streets with existing pavement width of 30 feet or more. Medians should be as continuous as possible with no more than two openings per 300 feet. Parking shall not be allowed on a local residential street with a median. Medians shall be sized, designed, and marked in accordance with the design standards contained in this ordinance. Medians shall be designed to allow passage and turning of emergency vehicles. Medians are expected to reduce vehicle speeds by 5 to 10 percent. Traffic volume reduction is not expected, but may be experienced.



## **Median Bulbs**

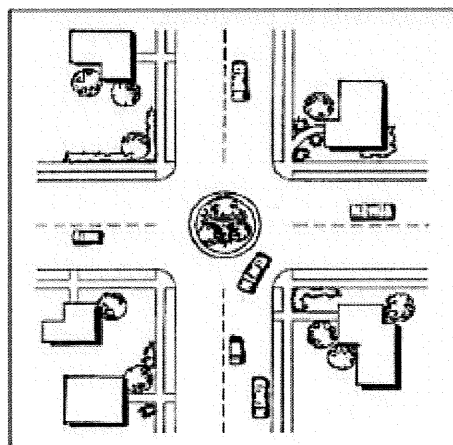
Median bulbs are flared and raised curb sections typically mid-block, that causes the traffic path to divert to the right and reduce speed. Some parking restrictions may be required in order to install median bulbs. This device is expected to reduce vehicle speeds by 5 to 10 percent.

## **Roundabouts**

Roundabouts are raised landscaped islands placed in an intersection and usually require geometric modifications to the intersection. Their primary purpose is to reduce vehicle speeds and discourage cut through traffic in neighborhoods. Roundabouts shall be designed to accommodate emergency vehicles and delivery trucks. Roundabouts may be installed at four way or tee intersections. Roundabouts may be installed only on streets with existing pavement width of 30 feet or more. This device is expected to reduce vehicle speed by 10 percent for through movements.

## **Mini-Roundabouts**

Mini-roundabouts, also known as traffic circles are raised landscaped islands placed in an existing intersection with little or no change to the intersection geometrics. Their primary purpose is to reduce vehicle speeds and discourage cut through traffic in neighborhoods. Mini-roundabouts shall be designed to accommodate emergency vehicles and delivery trucks. Mini-roundabouts may be installed only at four way intersections. Some parking restrictions may be required on approaches to intersections where mini-roundabouts are installed. This device is expected to reduce vehicle speed by 5 to 10 percent for through movements.



**Mini-Roundabout**

### **Curb Radius Reduction**

Curb radius reduction at an intersection is intended to slow turning vehicles and reduce pedestrian crossing distances. The radius shall accommodate a passenger vehicle. Curb radius reduction shall be allowed only at intersections of two local streets. This device is expected to reduce vehicle speeds by 5 to 10 percent.

### **On Street Parking Chicane**

On street parking chicanes require horizontal deflections by alternating the parking on opposite sides of the street. Parking chicanes are expected to reduce speeds by 5 to 10 percent and may slightly decrease traffic volumes in the neighborhood.

### **Bicycle Lanes**

Bicycle lanes provide exclusive space for bicycle travel within the street. Use of bicycle lanes shall comply with the Columbus Bicycle and Pedestrian Plan. Bicycle lanes effectively reduce the pavement width and calm traffic flow along the street. Bicycle lanes also provide a buffer between motor vehicle traffic and pedestrians when sidewalks are immediately adjacent to the curb. Bicycle lanes are expected to improve bicycle and pedestrian safety and reduce speeds by 5 to 10 percent.

### **Traffic Calming Maintenance**

The maintenance of all neighborhood traffic calming devices shall be the responsibility of the developer or the lot owners association. The developer shall provide documentation as part of the subdivision improvement agreement that such maintenance will be provided.

## Pedestrian Crossing Treatments

The following section shall supplement the Manual on Uniform Traffic Control Devices (MUTCD) regarding when and where to mark pedestrian crossings. The purpose of this section is to provide consistent engineering solutions to pedestrian safety concerns, particularly with regard to crosswalks. As with the installation of any traffic control devices, engineering judgment shall be required. All crosswalk pavement markings and signs shall be selected, designed, and installed in conformance with the MUTCD and this section.

Crosswalk markings shall not be used at all intersections or all legs of a particular intersection. Crosswalk markings shall be used only at locations where pedestrian activity is significant. Significant pedestrian activity shall be defined as meeting one or more of the following:

At least 15 pedestrians crossing the street during each of the two highest one hour periods in a day

On a school walking route

On a route to and within 1,000 feet of a park, community center, or transit facility.

The design of intersections shall take into consideration pedestrian crossings and safety.

**Table 1 - Criteria for Pedestrian Crossing Treatments**

Roadway Configuration	Roadway ADT and Posted Speed															
	Less than 5,000 vehicles/day				5,000 to 9,999 vehicles/day				10,000 to 19,999 vehicles/day				Over 20,000 vehicles/day			
	<30 mph	35 mph	40 mph	>45 mph	<30 mph	35 mph	40 mph	>45 mph	<30 mph	35 mph	40 mph	>45 mph	<30 mph	35 mph	40 mph	>45 mph
2 Lanes Residential	1	2	2	N	1	2	4	N	2	2	4	N	2	2	4	N
2 Lanes Commercial	1	2	2	N	1	2	4	N	2	2	4	N	2	2	4	N
2 Lanes Industrial	1	2	2	N	1	2	4	N	2	2	4	N	2	2	4	N
2 Lanes with Median	1	3	3	N	1	3	4	N	2	3	4	N	2	3	4	N
2 Lanes with Signal	1	2	2	2	1	2	3	3	2	2	3	3	2	2	3	4
3 Lanes or more	2	2	2	N	2	2	4	N	2	2	4	N	2	2	4	N
3 Lanes or more with Median	2	3	3	N	2	3	4	N	2	3	4	N	2	3	4	N
3 Lanes or more with Signal	1	2	2	2	2	2	3	3	2	2	3	3	2	2	3	4
School Routes	1	2	2	4	1	2	4	5	2	4	5	N	2	4	N	N

Numbers indicate level of protection required

ADT = average daily traffic

N = pedestrian treatments not recommended without engineering study

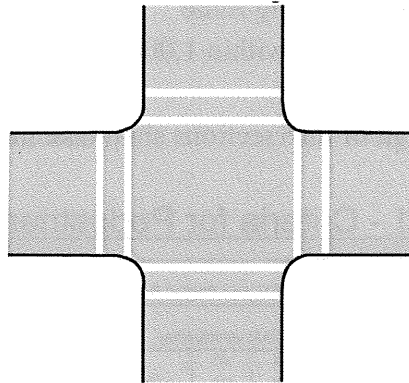
## Marking Crosswalks

Traffic control devices for pedestrian crossings shall be selected by using Table 1. For new streets, the expected traffic volumes and design speed of the streets shall be projected based on trip generated factors as published by the Institute of Transportation Engineers, latest edition.

### Types of Pedestrian Crossing Treatments

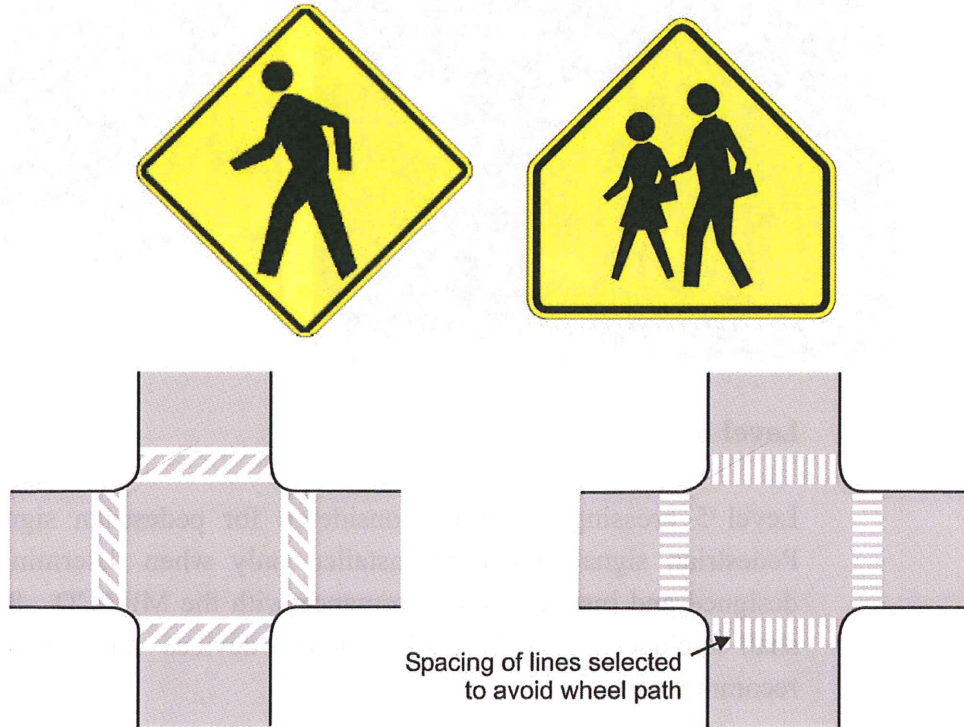
#### Level 1

Level one cross walks shall be marked with parallel lines. The lines shall be white and shall be reflective paint or thermoplastic as specified by the City Engineer. At stop or signal controlled intersections, stop bars shall be installed in advance of the crosswalk lines in conformance with the MUTCD.



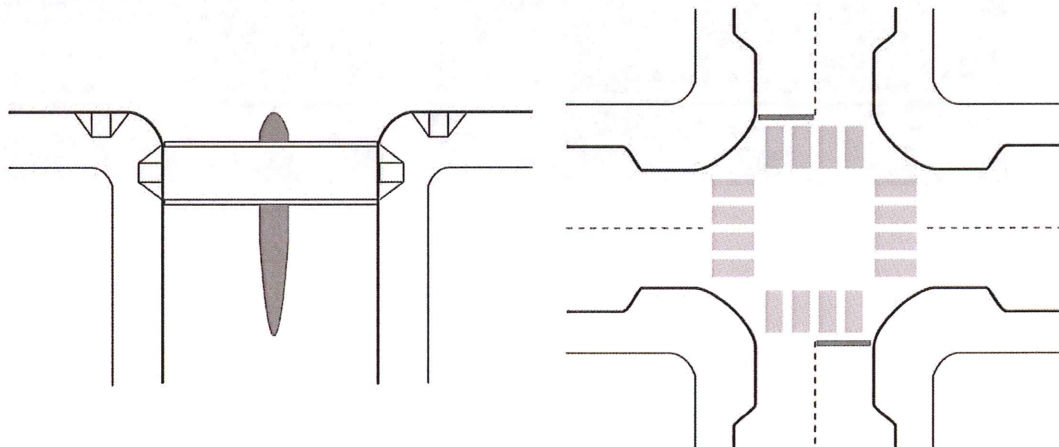
## Level 2

Level 2 crosswalks shall be marked with high visibility paint, or thermoplastic as specified by the City Engineer, pavement markings and advance warning and crossing signs in addition to the level 1 markings. High visibility markings shall include hatching (ladder or zebra designs) and advance “Ped Xing” or “School Xing” markings. All signalized intersections with pedestrian indications shall be marked with Level 2 markings.



## Level 3

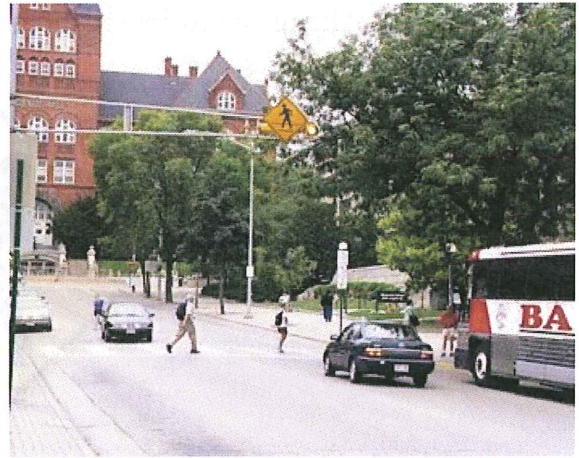
Level 3 crosswalks shall have pedestrian refuge islands and curb extensions in addition to the Level 2 markings and signs.





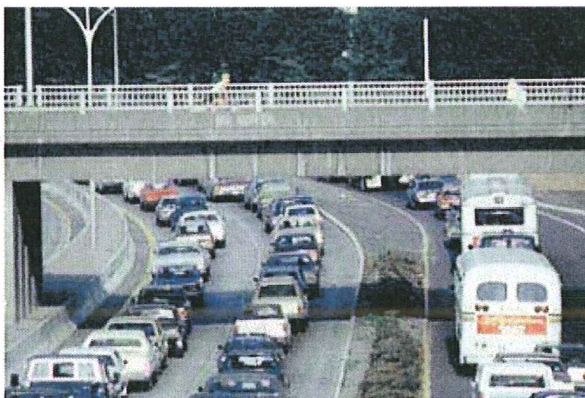
#### Level 4

Level 4 crosswalks should be marked with overhead warning signs, flashing beacons, or in-pavement lighting in addition to the Level 2 traffic control devices. Level 3 devices are also recommended.



#### Level 5

Level 5 crossings shall be considered for pedestrian signals or grade separation. Pedestrian signals shall be installed only when determined to be warranted and designed and installed in conformance with the MUTCD. Pedestrian signal locations shall include Level 2 traffic control devices and Level 3 and 4 devices are recommended.



## **Mid-Block**

Mid-Block Pedestrian Crossings should be avoided, especially when designing new facilities. They are generally acceptable only in low speed, low traffic areas, such as downtown. When used, mid-block crossings shall have Level 2 markings or higher.

## **Removal of Crosswalk Markings**

Whenever a street surface is being impacted by a reconstruction or resurfacing project, the City Engineer shall review all impacted crosswalks and crossings to determine if the existing markings are warranted. Engineering judgment should be exercised when removing or reducing the level of markings.

## **Curb Ramps**

Curbs ramps shall be installed at all intersections and signalized commercial drives. Curb ramps shall comply with American with Disabilities Act (ADA), Indiana Accessibility Code, and City of Columbus requirements.

## **School Crossing Guards**

The use of school crossing guards is determined by the Columbus Police Department and shall be in addition to the traffic control devices recommended in this document.

## **Communication Conduits**

Communication conduits shall be installed in all streets classified as major arterial, minor arterial, or collector. The Plan Commission may also require communications conduits in local streets as deemed necessary. Communications conduits shall be four inch inside diameter PVC or other approved non-corrosive material with manholes at a maximum spacing of 500 feet between suitable handholes.

## **Landscaping**

### **Ground Cover**

Grass or other suitable ground cover shall be planted, established, and maintained in all unpaved areas within the R/W. All ground covers shall meet the requirements of Article 8 of the City of Columbus Zoning Ordinance. All grasses and vegetation in the R/W shall be planted and maintained to conform to Chapter 8.32 of the Columbus City Municipal Code. All plantings shall be installed as to not interfere with the roadway drainage system.

### **Shrubs**

Planting of shrubs in the R/W must be planned so that selected species do not cause sight distance or maintenance problems. Shrub height shall not exceed 2 1/2 feet above pavement level at maturity so as not to impede sight distance. All shrubs in the R/W shall be planted and maintained to conform to Chapter 12.20 of the Columbus City Municipal Code. Non-qualifying plants, as identified in Article 8 of the City of Columbus Zoning Ordinance, shall not be planted in the R/W.

### **Water Bodies**

Detention ponds, retention ponds, borrow pits, lakes, or any other man-made water bodies shall not be located within any street rights-of-way or within 50 feet of said street rights-of-way. Any such man-made water bodies shall be constructed with a berm or landscaping to protect motorists if the water body is located within 150 feet of any street right-of-way.



## **Access**

### **Permit Required**

Each driveway that is not reviewed as part of an approved site plan for zoning compliance shall receive a driveway permit from the City Engineer's office. The permit should include a plan sketch as well as profile view of the drive. Existing and proposed features including but not limited to curbs, sidewalks, pavement, fire hydrants, water valves, storm sewer structures, sanitary sewer structures, utility poles, electrical transformers, telecommunications boxes, traffic signals, and street signs. The application should demonstrate that all applicable sections of the Zoning ordinance the Americans with Disabilities Act, and requirements of this document will be met.

### **Right Turn Lanes**

Right Turn Lanes are required for commercial and industrial access points from the following street classifications.

- Principal Arterial – Suburban – All land use types
- Principal Arterial – Rural – All land use types
- Minor Arterial – Suburban – All land use types
- Minor Arterial – Rural – All land use types
- Collector – Suburban – All land use types
- Collector – Rural – All land use types

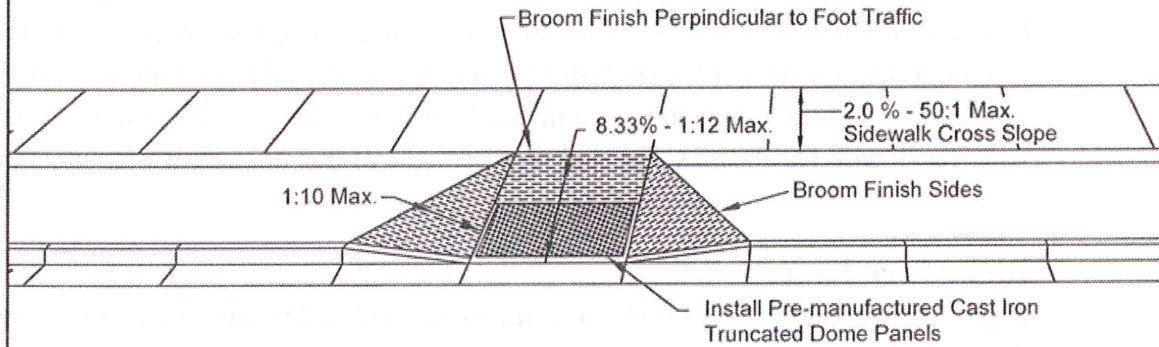
Right turn lanes will consist of a minimum 100 foot inbound taper, a 100 foot deceleration lane, and a 150 foot outbound taper. The lane will be 12 feet wide.

## **Construction Details**

Construction details are to be used for all public improvements. These details should be included on site plans that require improvements within City right-of-way and major subdivision plans.

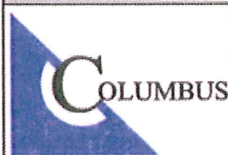
## Accessible Ramp

### Standard Accessible Ramp Detail



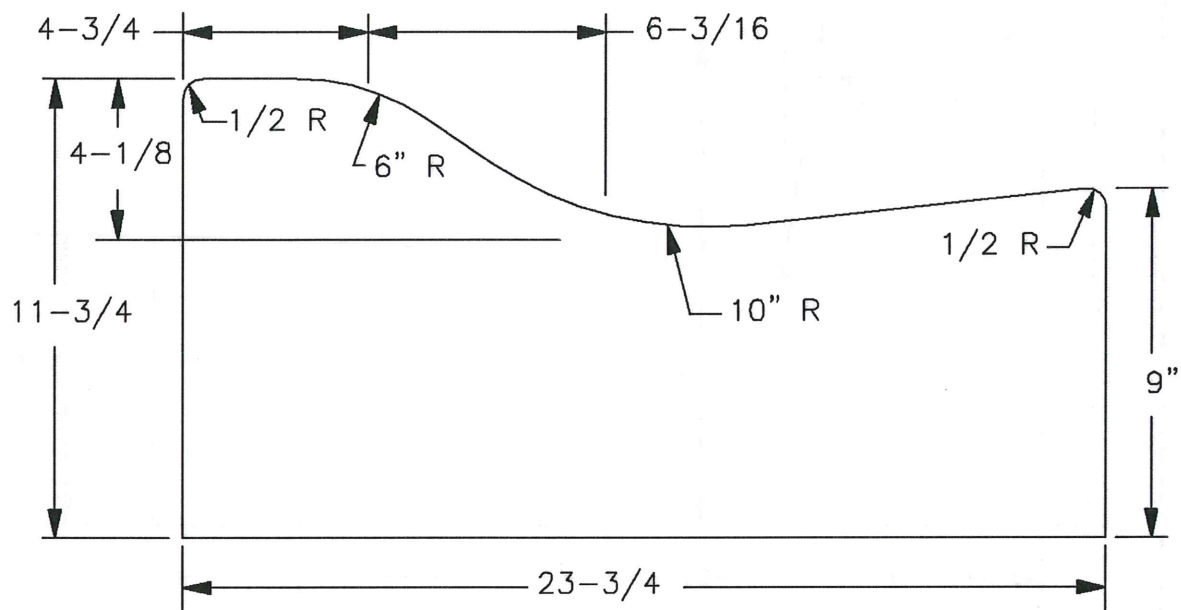
#### NOTES:

1. All ramps installed shall meet current A.D.A. standards and specifications.
2. Ramp design and location may vary and flared sides are not required for all applications.
3. Longitudinal slope of all ramps shall not exceed 1:12 or 8.33%.
4. Use INDOT class "A" concrete at a minimum depth of 6".
5. Install a pre-manufactured cast iron truncated dome panel, within the first 2'-0" of the ramp, across the entire opening. Ramps that are designed in a radius shall have panels custom made to fit the specified radius.


	DWN BY:	<b>CITY OF COLUMBUS</b> OFFICE OF CITY ENGINEER 123 WASHINGTON STREET COLUMBUS, INDIANA 47201	SHEET TITLE:		<b>ACCESSIBLE RAMP DETAIL</b>	
	J. PERRY					
	DATE:					
	11/30/09					
	SCALE:		FILE:		SHEET:	OF:
	N.T.S.		S:\Administrative\CAD\Detail		1	1

# Curb

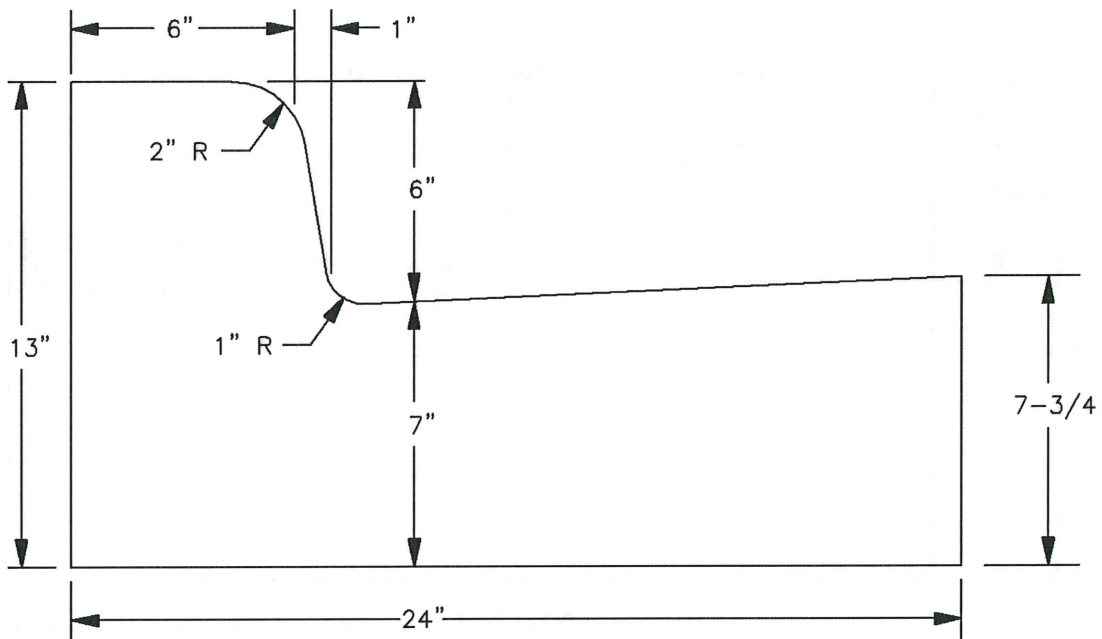
## Roll Curb and Gutter



4" ROLL CURB & GUTTER

	DWN BY:	CITY OF COLUMBUS OFFICE OF CITY ENGINEER 123 WASHINGTON STREET COLUMBUS, INDIANA 47201			SHEET TITLE:		
	DATE:				FILE:		
	SCALE:						

Vertical Curb and Gutter



6" VERTICAL CURB & GUTTER

CITY OF COLUMBUS  
OFFICE OF CITY ENGINEER  
123 WASHINGTON ST.  
COLUMBUS, INDIANA 47201

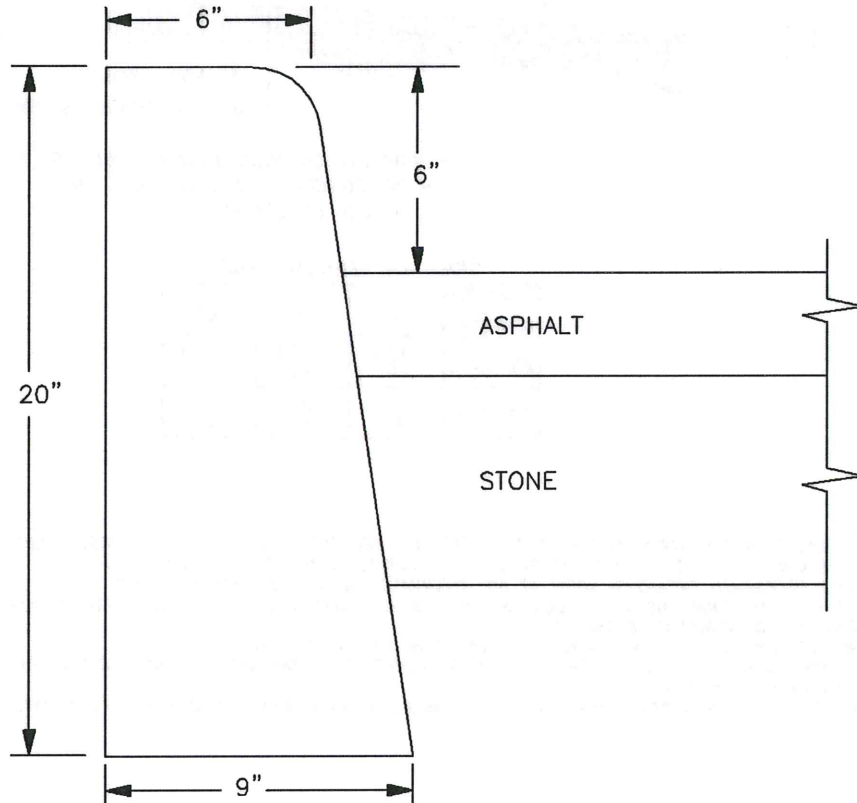
DRAWN BY:  
S. PLUMMER

CHECKED BY:  
S. RUCKER

SCALE:  
NONE

DATE:  
6/30/2000

Stand up Curb



CONCRETE VERTICAL CURB

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OFFICE OF CITY ENGINEER  
123 WASHINGTON ST.  
COLUMBUS, INDIANA 47201

DRAWN BY:  
S.PLUMMER

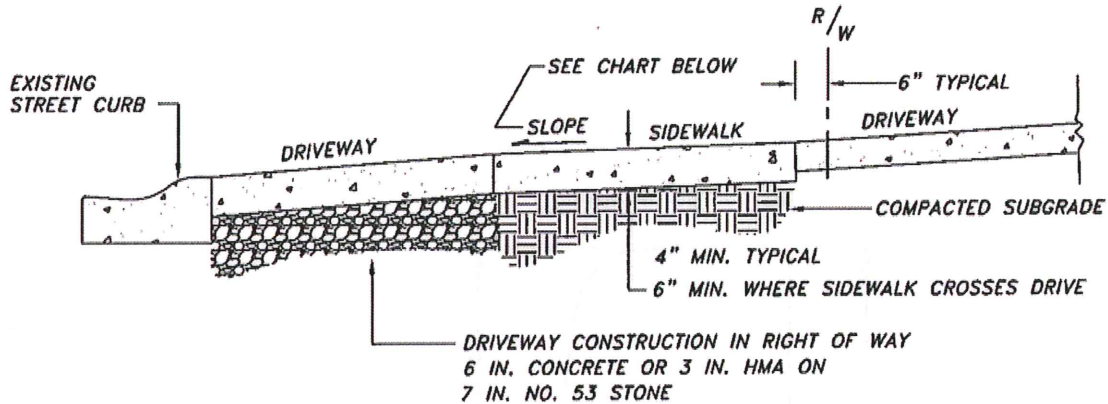
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S. RUCKER

SCALE:  
NONE

DATE:  
6/30/2000

## Sidewalk and Drive

### SIDEWALK & DRIVEWAY DETAIL



SIDEWALK VERTICAL DROP

WIDTH SLOPE	4'	5'	8'
2% MAX.	15" 16"	13" 16"	12" 18"
.5% MIN.	1" 4"	5" 16"	1" 2"

NOTES:

1. LONGITUDINAL SLOPE FOR SIDEWALK 5% MAX. (1" VER. PER 20" HORIZ.) SIDEWALK CROSS SLOPE: 2% MAX./0.5% MIN.
2. INSTALL CONTROL JOINTS, TOOLED OR SAWED, AT INTERVALS EQUAL TO SIDEWALK WIDTH.
3. INSTALL PREFORMED EXPANSION JOINT AT 50' INTERVALS AND AT ALL PROPERTY LINES.
4. SIDEWALK WIDTH SHALL BE 4' ON LOCAL STREETS, 5' ON COLLECTOR AND ARTERIAL STREETS, AND 1' ADDITIONAL WIDTH IF SIDEWALK IS ADJACENT TO THE CURB.
5. CONCRETE FOR SIDEWALK AND DRIVE SHALL BE 6" IN THE RIGHT-OF-WAY.
6. ALL FORM WORK IN THE RIGHT-OF-WAY MUST BE INSPECTED BY THE CITY ENGINEERS OFFICE (812-376-2540) PRIOR TO PLACEMENT OF CONCRETE.
7. CONCRETE SHALL BE: INDOT CLASS "A", BROOM FINISH. APPLY CURING COMPOUND: ASTM 1315, TYPE 1, CLASS "A".

DRAWN BY: JASON PERRY

DATE: 9/13/2004



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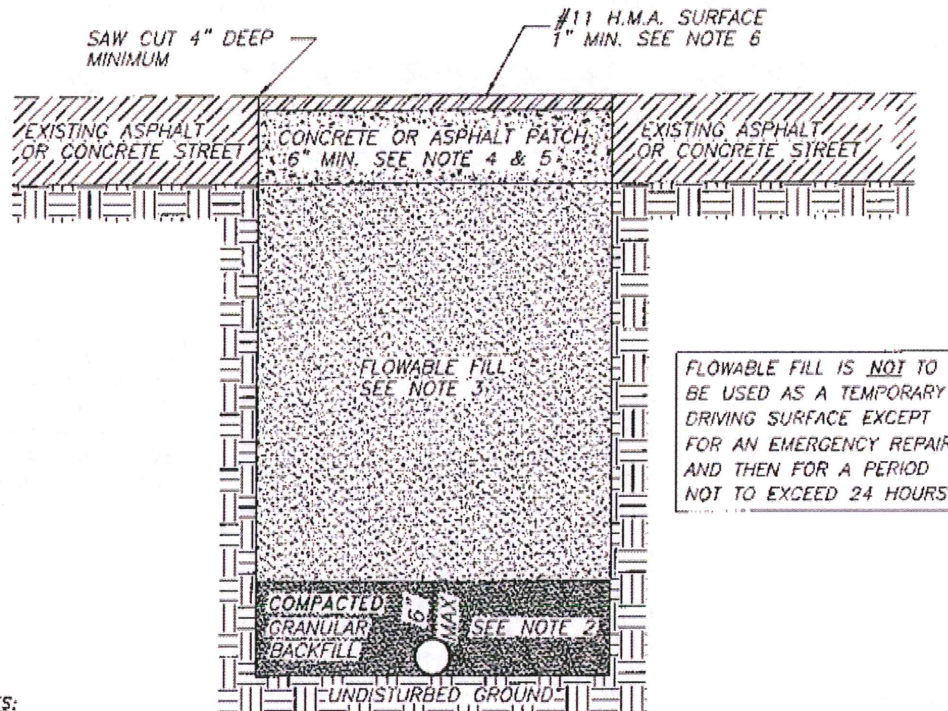
G:\ENGINEER\DETAIL\SIDEWALK&DRIVE



## Standard Street Cut

### STANDARD STREET CUT REPAIR DETAIL

SEE CITY ORDINANCE No.96-55



#### NOTES:

1. THIS STREET REPAIR PROCEDURE SHALL BE USED FROM APRIL 15th UNTIL NOVEMBER 15th OR AS LONG AS H.M.A. IS AVAILABLE.
2. BED PIPE OR CONDUIT WITH APPROVED COMPACTED GRANULAR MATERIAL (SAND, PIT RUN OR B-BORROW).
3. FLOWABLE FILL SHALL HAVE A COMPRESSIVE STRENGTH OF 50 TO 150 P.S.I. FLOWABLE FILL SHALL BE SUPPLIED BY A PROVIDER APPROVED BY THE CITY ENGINEER. APPROVAL SHALL BE BASED ON INDOT PREQUALIFICATION AND SUBMITTAL OF OF ACCEPTABLE MIX DESIGN(S).
4. ASPHALT STREETS: ASPHALT PATCH SHALL BE 5D BASE OR EQUAL, 6" MINIMUM DEPTH OR MATCH EXISTING. CONCRETE PATCH SHALL BE 6" MINIMUM DEPTH OR MATCH EXISTING, HIGH STRENGTH INDOT CLASS "C", WITH 2% CALCIUM AND SHALL BE PLACED WITHIN 24 HOURS.
5. CONCRETE STREETS: CONCRETE PATCH SHALL BE 6" MINIMUM DEPTH OR MATCH EXISTING, HIGH STRENGTH INDOT CLASS "C", WITH 2% CALCIUM, FLUSH WITH EXISTING SURFACE, BROOM FINISHED AT RIGHT ANGLES TO TRAFFIC FLOW AND SHALL BE PLACED WITHIN 24 HOURS.
6. PLACE 1" PATCH OF #11 SURFACE H.M.A. (WITHIN 24 HOURS) FLUSH WITH EXISTING SURFACE, SURFACE OF CONCRETE OR ASPHALT PATCH AND EDGES OF EXISTING ASPHALT SHALL BE TACK COATED BEFORE PLACING H.M.A. PATCH.
7. IF MORE THAN ONE CUT IS MADE ON A CITY STREET, AND THE DISTANCE BETWEEN THE TWO IS 5'-00" OR LESS, THE CONTRACTOR OR PERSONS MAKING THE REPAIR WILL BE REQUIRED TO REMOVE THE SURFACE BETWEEN THE CUTS AND MAKE ONE REPAIR.
8. CONTRACTOR SHALL NOTIFY THE CITY ENGINEER'S OFFICE @ (812) 376-2540 BEFORE PLACING THE PATCH.
9. ALL OVERCUTTING AND ENTIRE PERIMETER OF FINAL REPAIR TO BE CLEANED AND SEALED WITH ASPHALT CRACK SEALER.

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DRAWN BY: JASON PERRY

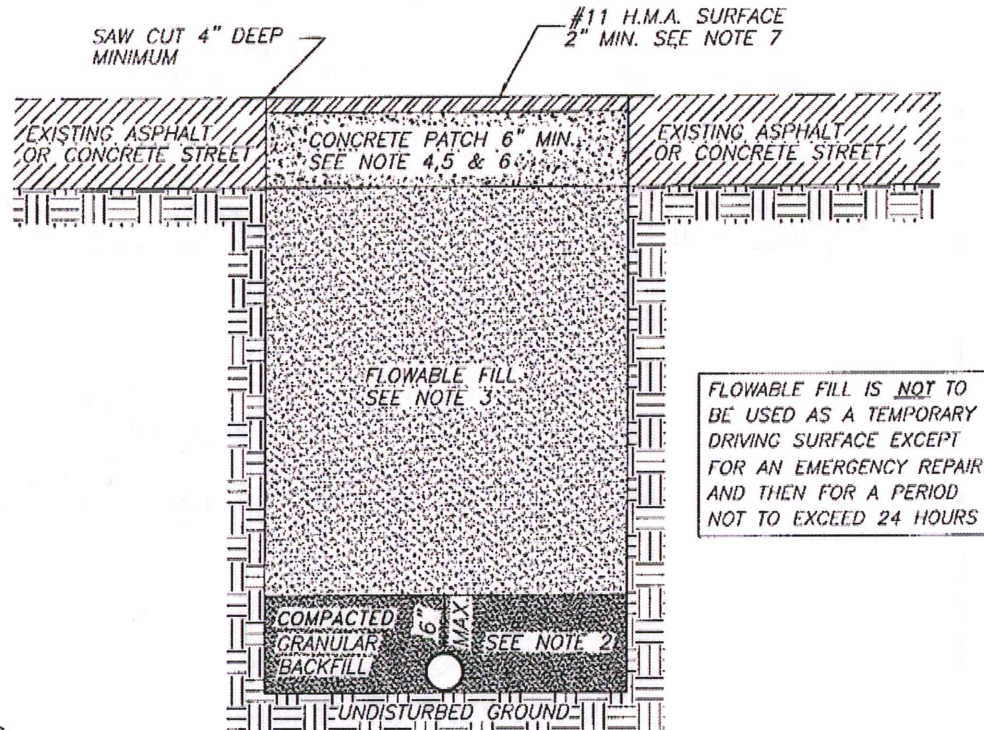
DATE: 4/1/09

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OFFICE OF CITY ENGINEER  
123 WASHINGTON ST. COLUMBUS, INDIANA 47201

## Winter Street Cut

### WINTER STREET CUT REPAIR DETAIL

SEE CITY ORDINANCE No.96-55



#### NOTES:

1. THIS STREET REPAIR PROCEDURE SHALL BE USED FROM NOVEMBER 16th UNTIL APRIL 14th OR AS LONG AS H.M.A. IS NOT AVAILABLE.
2. BED PIPE OR CONDUIT WITH APPROVED COMPACTED GRANULAR MATERIAL (SAND, PIT RUN OR B-BORROW).
3. FLOWABLE FILL SHALL HAVE A COMPRESSIVE STRENGTH OF 50 TO 150 P.S.I. FLOWABLE FILL SHALL BE SUPPLIED BY A PROVIDER APPROVED BY THE CITY ENGINEER. APPROVAL SHALL BE BASED ON INDOT PREQUALIFICATION AND SUBMITTAL OF ACCEPTABLE MIX DESIGN(S).
4. ASPHALT STREETS: CONCRETE PATCH SHALL BE 6" MIN. DEPTH OR MATCH EXISTING, PLACED WITHIN 24 HOURS.
5. CONCRETE STREETS: CONCRETE PATCH SHALL BE 6" MINIMUM DEPTH OR MATCH EXISTING, FLUSH WITH EXISTING SURFACE AND BROOM FINISHED AT RIGHT ANGLES TO TRAFFIC FLOW, PLACED WITHIN 24 HOURS.
6. ALL CONCRETE SHALL BE INDOT CLASS "C", WITH 2% CALCIUM AND SHALL BE COVERED AND INSULATED FOR 4 HOURS PRIOR TO BEING OPENED TO TRAFFIC.
7. PLACE TEMPORARY 2" PATCH OF COLD MIX FLUSH WITH EXISTING SURFACE WITHIN 24 HOURS. TEMPORARY PATCH SHALL BE REMOVED AND REPLACED WITH 2" OF #11 H.M.A. SURFACE AS SOON AS H.M.A. BECOMES AVAILABLE. SURFACE OF CONCRETE AND EDGES OF EXISTING ASPHALT SHALL BE TACK COATED BEFORE PLACING H.M.A.
8. IF MORE THAN ONE CUT IS MADE ON A CITY STREET, AND THE DISTANCE BETWEEN THE TWO IS 5'-00" OR LESS, THE CONTRACTOR OR PERSONS MAKING THE REPAIR WILL BE REQUIRED TO REMOVE THE SURFACE BETWEEN THE CUTS AND MAKE ONE REPAIR.
9. CONTRACTOR SHALL NOTIFY THE CITY ENGINEER'S OFFICE @ (812) 376-2540 BEFORE PLACING CONCRETE OR ASPHALT PATCH.
10. ALL OVERCUTTING AND ENTIRE PERIMETER OF FINAL REPAIR TO BE CLEANED AND SEALED WITH ASPHALT CRACK SEALER.
11. FINAL REPAIRS SHALL BE COMPLETED NO LATER THAN MAY 1st.

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DRAWN BY: JASON PERRY

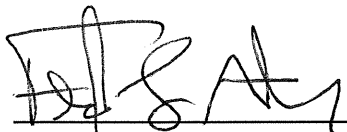
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OFFICE OF CITY ENGINEER  
123 WASHINGTON ST. COLUMBUS, INDIANA 47201



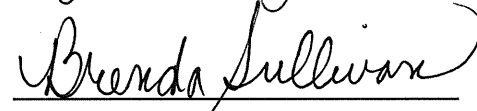
## Adoption

Be it resolved by the Board of Public Works and Safety, City of Columbus, Indiana, that this Policy Manual for the Office of the City Engineer is hereby approved and accepted this 15<sup>th</sup> day of February, 2011.

  
Fred L. Armstrong, Mayor

  
Judy Johns-Jackson, Member

  
Steven Gochenour, Member

  
Brenda Sullivan, Clerk Treasurer

